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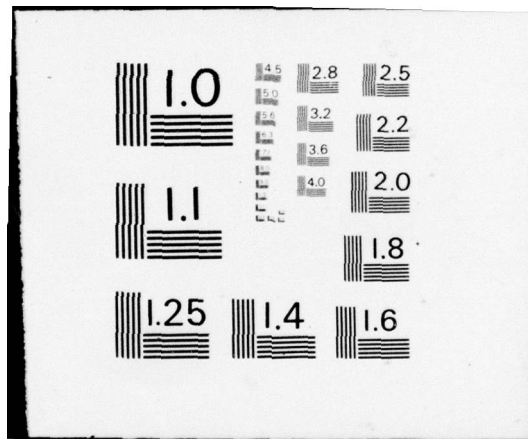
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SOUNDING ROCKET AND BALLOON SYSTEMS SUPPORT

by

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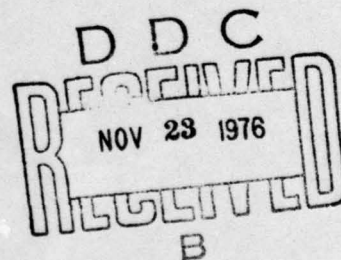
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May 1973 - July 1976

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) The work performed under this contract consisted of the following; integrate, calibrate, and test, GFE range safety radar tracking beacon and parachute recovery systems; design and develop special devices as required; operate and maintain GFE telemetry station to support telemetry operations at WSMR, New Mexico; and calibrate equipment and perform analyses for air sampling balloon flights conducted at Holloman AFB, New Mexico.		

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1.0 SCOPE OF WORK

The Physical Science Laboratory, New Mexico State University shall provide the necessary personnel, facilities and materials to operate, provide engineering assistance, and install flight and ground equipment in support of rocket flights at WSMR, New Mexico, and calibrate equipment and perform analyses for air sampling balloon flights at Holloman AFB, New Mexico, in accordance with the following:

1.1 Integrate GFE range safety systems into thirty (30) Government-owned sounding rockets. Calibrate and test systems, as part of pre-launch test procedures.

1.2 Integrate GFE radar tracking beacon systems into thirty (30) Government-owned sounding rockets. Conduct tests of tracking beacon as part of pre-launch tests.

1.3 Integrate GFE parachute recovery systems into thirty (30) Government-owned sounding rockets. Prepare all interconnecting and control circuitry. Conduct tests of recovery systems as part of prelaunch tests.

1.4 Design and fabricate special devices as required, to be used on the thirty (30) Government-owned sounding rockets, as part of the total integration of the rocket payloads.

1.5 Operate and maintain a portable telemetry station with GFE accountable under Facilities Contract F19628-71-C-0169, to support all prelaunch rocket payload tests, and to assist in the recovery of telemetry data during launch operations. Telemetry operations to be conducted at White Sands Missile Range, New Mexico unless rockets are re-scheduled to other launch facilities.

1.6 Calibrate GFE air samplers for ten (10) balloon flights in accordance with a handbook of instructions furnished by the government.

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1.7 Analyze pre-flight and post-flight data and meteorological parameters to determine air flow rates, balloon trajectories and ambient atmospheric conditions.

1.8 Reports are required hereunder and shall be prepared in accordance with the "Outline of Reporting Procedures for Air Force Cambridge Research Laboratories Contractors."

2.0 TECHNICAL PROGRESS

2.1 Rocket Launches Supported During the Contract Period

<u>Launch Date</u>	<u>Launch No.</u>	<u>Vehicle Type</u>	<u>TM System</u>	<u>Launch Station</u>
8/10/73	A03.211-1	Aerobee 150	FM/FM	WSMR
9/11/73	A09.214-1	Ute-Tomahawk	FM/FM/PCM	WSMR
10/3/73	A03.311-1	Astrobee "D"	FM/FM	WSMR
10/3/73	A03.311-2	Astrobee "D"	FM/FM	WSMR
10/3/73	A03.311-3	Astrobee "D"	FM/FM	WSMR
11/2/73	A04.104-2	Aerobee 170	FM/FM/PCM	WSMR
2/16/74	A35.191-2	Aerobee 350	PCM/FM	WSMR
2/16/74	A09.400-1	Ute-Tomahawk	FM/FM	WSMR
4/23/74	A04.208-2	Aerobee 170	FM/FM/PCM	WSMR
6/29/74	A04.028-1	Aerobee 170	Wiring Support Only	Wallops
8/16/74	A09.214-2	Ute-Tomahawk	FM/FM/ PAM/PCM	WSMR
9/4/74	A05.391-1	Aerobee 200	PCM/FM	Australia
9/11/74	A05.391-2	Aerobee 200	PCM/FM	Australia
9/17/74	A05.391-3	Aerobee 200	PCM/FM	Australia
10/17/74	AF4.0400	Nike-Hidak	FM/FM	WSMR (Sulf Site)
12/13/74	A09.407-1	Ute-Tomahawk	FM/FM FM/FM	WSMR
6/10/75	A03.103-1	Aerobee 150	FM/FM/PCM	WSMR
8/6/75	A04.308-1	Aerobee 170	PCM/FM	WSMR
9/18/75	A010.304-1	Paiute-Tomahawk	FM/FM	WSMR

<u>Launch Date</u>	<u>Launch No.</u>	<u>Vehicle Type</u>	<u>TM System</u>	<u>Launch Station</u>
9/18/75	A010.304-2	Paiute-Tomahawk	FM/FM	WSMR
10/14/75	A031.320-2	Astrobee "F"	FM/FM	WSMR
10/16/75	A010.000-2	Paiute-Tomahawk	FM/FM	WSMR
12/2/75	A30.311-8	Astrobee "D"	FM/FM	WSMR
12/2/75	A30.311-5	Astrobee "D"	FM/FM	WSMR
12/2/75	A30.311-7	Astrobee "D"	FM/FM	WSMR
12/2/75	A30.413-5	Astrobee "D"	FM/FM	WSMR
12/2/75	A30.205-7	Astrobee "D"	FM/FM	WSMR
12/2/75	A30.413-4	Astrobee "D"	FM/FM	WSMR
12/3/75	A35.191-1	Aerobee 350	PCM/FM	WSMR
2/24/76	A04.305-1	Aerobee 170	PCM/PAM/ FM/FM	WSMR
5/18/76	A03.410-1	Aerobee 150	FM/FM/PCM	WSMR

2.2 Balloon Flights Supported During the Contract Period

<u>Date</u>	<u>Flight No.</u>	<u>Project</u>	<u>Location</u>	<u>Bln Size</u> <u>(x 10⁶ ft³)</u>	<u>Alt</u> <u>(Kft)</u>
10/9/75	H75-41	Gamma Ray	Holloman NM	26.600	128
10/15/75	H75-42/H-69	Ash Can	Holloman NM	0.803	70
10/20/75	H75-43/H-70	Ash Can	Holloman NM	0.803	80
10/29/75	H75-44/H-71	Ash Can	Holloman NM	0.859	90
10/31/75	H75-45/H-72X	Ash Can	Holloman NM	0.127	60
11/5/75	H75-46/H-73	Ash Can	Holloman NM	0.274	70
11/7/75	H75-47/H-74	Ash Can	Holloman NM	0.516	80
11/14/75	H75-49/H-75	Ash Can	Holloman NM	0.028	5
12/2/75	H75-54/H-76X	Ash Can	Holloman NM	0.127	60
2/8/76	H76-5/H-77X	Ash Can	Holloman NM	0.450	90
2/12/76	H76-6	6687	Holloman NM	0.074	50
2/13/76	H76-7/H-78X	Ash Can	Holloman NM	1.840	105
2/15/76	H76-8/H-79X	Ash Can	Holloman NM	0.516	80
2/17/76	H76-9/H-80X	Ash Can	Holloman NM	0.274	70
2/18/76	H76-10/H-81X	Ash Can	Holloman NM	0.859	98
2/23/76	H76-11/H-82X	Ash Can	Holloman NM	0.859	90

<u>Date</u>	<u>Flight No.</u>	<u>Project</u>	<u>Location</u>	<u>Bln Size</u> <u>(x 10⁶ ft³)</u>	<u>Alt</u> <u>(Kft)</u>
2/26/76	H76-12/H-83X	Ash Can	Holloman NM	2.010	98
3/29/76	H76-14/P-144	Ash Can	Panama CZ	0.516	80
4/1/76	H76-15/P-145	Ash Can	Panama CZ	0.274	80
4/2/76	H76-16/P-146	Ash Can	Panama CZ	0.859	90
4/3/76	H76-17/P-147X	Ash Can	Panama CZ	1.840	105
4/4/76	H76-18/P-148X	Ash Can	Panama CZ	4.890	120
4/19/76	H76-19/H-84X	Ash Can	Holloman NM	0.145	60
5/11/76	H76-22/A-130X	Ash Can	Eielson AK	4.850	120
5/13/76	H76-23/A-131X	Ash Can	Eielson AK	2.010	105
5/14/76	H76-24	6687	Eielson AK	0.274	66
5/16/76	H76-25/A-132	Ash Can	Eielson AK	0.274	70
5/17/76	H76-26/A-133	Ash Can	Eielson AK	0.516	80
5/18/76	H76-27/A-134	Ash Can	Eielson AK	0.859	90
5/19/76	H76-28	6687	Eielson AK	0.127	49
5/19/76	H76-38	6687	Eielson AK	0.803	49
5/20/76	H76-39/A-135	Ash Can	Eielson AK	0.516	70
6/17/76	H76-37/H-85	Ash Can	Holloman NM	0.355	70
6/21/76	H76-40/H-86	Ash Can	Holloman NM	0.628	80
6/23/76	H76-41/H-87	Ash Can	Holloman NM	1.110	90
6/25/76	H76-42/H-88	Ash Can	Holloman NM	0.274	70
6/29/76	H76-43/H-89X	Ash Can	Holloman NM	2.010	105
7/7/76	H76-44/H-90X	Ash Can	Holloman NM	4.890	120

2.3 Summary of Work Performed

Telemetry, beacon and command receiver antennas were installed as required for each launching.

Beacon, telemetry and command receiver units were installed as required.

Parachutes and associated recovery components were installed to permit recovery of special scientific payloads.

Wire and coaxial cable harnesses were fabricated and installed.

Flight and spare battery packs were prepared for each rocket.

Laboratory personnel checked and installed fuel squibs and detonator blocks and assisted with the installation of the associated pyrotechnic train.

Engineering services were provided as required for each flight.

Laboratory personnel participated in all horizontal and vertical missile systems tests.

Ground stations were operated to facilitate recovery of scientific data from the rockets.

Realtime and playback records were processed as required by the project scientists.

Air sampler calibrations for GFE sensors were performed and analyses of atmospheric conditions were made prior to each balloon flight.

Analyses to determine actual air flow rates, balloon trajectories and ambient atmospheric conditions, were made following each balloon flight.

2.4 General

Laboratory personnel participated in the recovery system installation in Rocket A04.2081 at Wallops Island, Virginia in June 1974.

Engineering and instrumentation support was provided as required for Aerobee A09.3911, A09.3912 and A09.3913 launches at Woomera Range, Australia in September 1974.

Engineering and instrumentation support was provided in an attempted launch in August 1974 and launch in October 1974 of the Nike-Hidak AF4.0400 at WSMR Sulf Site.

Two periods of travel were required to support the high altitude balloon research effort. The first was to the Panama Canal Zone in March 1976 and the second to Fairbanks, Alaska in May 1976.

2.5 Equipment Acquired During the Contract Period

2 each	Multimeter, digital	Scientific Devies, Model 7050	\$ 598.00
2 each	Power Supplies	Hewlett Packard, Model 6291A	790.00
1 each	PCM Bit Synchronizer	EMR, Model 720-02-0-3-4	6,184.50
1 each	Receiver, telemetry with accessories	International Engineering Model TR-711	8,630.00
1 each	Scope, mobile	Tektronix, Model 200-1B	120.00
1 each	Oscilloscope, Dual Trace	Tektronix, Model 475	2,500.00
1 each	DC Inverter	Tektronix	75.00
1 each	Signal Generator	Hewlett Packard, Model 8641A	2,544.30
2 each	Channel Selector	EMR, Model 210B	600.00
2 each	Output Filter	EMR, Model 210	200.00